IN THE CLAIMS

Please amend claims 1-9; 12-16; and 24-27; cancel claims 14-15 and 21-23; and add new claims 29-41, as follows:

What is claimed is:

1. (Currently Amended) A system, comprising:

a first executing process that:

implements a first <u>continuous-time</u> model to simulate a first subsystem, the first model being programmed in a first language and having a first state variable; and

sends a first series of state-related ~~messages~~ <u>numerical values</u>, each ~~message~~ <u>numerical value</u> reflecting information relating to the value of the first state variable at a different point t_m in simulation time in the first model; and

a second executing process that:

receives said first series of state-related ~~messages~~ <u>numerical values</u>; and

implements a second <u>continuous-time</u> model to simulate a second subsystem, the second model being programmed in a second language and taking as an input the value of the first state variable from said first series of state-related ~~messages~~ <u>numerical values</u>.

2. (Currently Amended) The system of claim 1, wherein:

the second model has a second state variable;

said second process further sends a second series of state-related ~~messages~~ <u>numerical values</u>, each ~~message~~ <u>numerical value</u> reflecting information relating to the value of the second state variable at a different point t_n in simulation time in the first model;

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said first process further receives said second series of state-related ~~messages~~ <u>numerical</u>

<u>values</u>; and

the first model takes as an input the value of the second state variable from said second

series of state-related ~~messages~~ <u>numerical values</u>.

3. (Currently Amended) The system of claim 2, wherein for at least a first ~~message~~ <u>numerical</u>

<u>value</u> in said first series of state-related ~~messages~~ <u>numerical values</u>, said first ~~message~~ <u>numerical</u>

<u>value</u> reflecting information relating to the value of the first state variable at point t_i in

simulation time in the first model, there is a second ~~message~~ <u>numerical value</u> in said second

series of state-related ~~messages~~ <u>numerical values</u> that reflects the value of the second state

variable at point t_i in simulation time in the first model.

4. (Currently Amended) The system of claim 2, wherein for at least a first ~~message~~ <u>numerical</u>

<u>value</u> in a series of state-related ~~messages~~ <u>numerical values</u>, said first ~~message~~ <u>numerical value</u>·

reflecting the value of the first state variable at point t_i in simulation time, there is no second

~~message~~ <u>numerical value</u> in said second series of state-related ~~messages~~ <u>numerical values</u> that

reflects the value of the second state variable at point t_i in simulation time.

5. (Currently Amended) The system of claim 1, wherein:

said first series of state-related ~~messages~~ <u>numerical values</u> comprises

a first ~~message~~ <u>numerical value</u> reflecting information relating to the value of

the first state variable at time t_i in simulation time in the first model;

a second ~~message~~ <u>numerical value</u> reflecting information relating to the value

of the first state variable at time t_2 in simulation time in the first model; and

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a third ~~message~~ <u>numerical value</u> reflecting information relating to the value

of the first state variable at time t_3 in simulation time in the first model; and

wherein the first ~~message~~ <u>numerical value</u>, second ~~message~~ <u>numerical value</u>, and third

~~message~~ <u>numerical value</u> are consecutive within said first series of state-related ~~messages~~

<u>numerical values</u>; and $t_2\text{-}t_1 = t_3\text{-}t_2$.

6.   (Currently Amended) The system of claim 1, wherein:

said first series of state-related ~~messages~~ <u>numerical values</u> comprises

a first ~~message~~ <u>numerical value</u> reflecting information relating to the value of

the first state variable at time t_1 in simulation time in the first model;

a second ~~message~~ <u>numerical value</u> reflecting information relating to the value

of the first state variable at time t_2 in simulation time in the first model; and

a third ~~message~~ <u>numerical value</u> reflecting information relating to the value

of the first state variable at time t_3 in simulation time in the first model; and

wherein the first ~~message~~ <u>numerical value</u>, second ~~message~~ <u>numerical value</u>, and third

~~message~~ <u>numerical value</u> are consecutive within said first series of state-related messages; and $t_2\text{-}$

$t_1 \neq t_3\text{-}t_2$.

7.   (Currently Amended) The system of claim 1, wherein:

said first ~~set of programming instructions~~ <u>executing process</u> exposes a first interface for the

first model, where said first interface:

prevents access by said second ~~set of programming instructions~~ <u>executing</u>

<u>process</u> to a first substantial portion of the first model, and

allows access by said second ~~set of programming instructions~~ executing

process to a second substantial portion of the first model; and

said second ~~set of programming instructions~~ executing process exposes a second interface

for the second model, where said second interface:

prevents access by said first ~~set of programming instructions~~ executing

process to a first substantial portion of the second model, and

allows access by said first ~~set of programming instructions~~ executing process

to a second substantial portion of the second model.

8. (Currently Amended) The system of claim 1, wherein

the first model has a third state variable;

each ~~message~~ numerical value in said first series of state-related ~~messages~~ numerical values

further reflects information relating to the value of the third state-variable at point t_m in

simulation time; and

the second model also takes the third state variable as an input from said first series of state-

related ~~messages~~ numerical values.

9. (Currently Amended) A method for simulating operation of a physical system having a

plurality of physical subsystems, comprising:

simulating a first physical subsystem with a first continuous-time simulation;

accepting a request for export of information relating to a number n of state-related variables

that characterize the state of the first physical subsystem in said simulating;

sending a first series of state-related messages, each message containing information relating

to the value of at least one of the n state-related variables; and

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simulating a second physical subsystem <u>with a second continuous-time simulation;</u> wherein:

~~the request is made in conjunction with said simulating a second physical subsystem;~~

the first physical subsystem interacts with the second physical subsystem; and

the at least one state<u>-related</u> variable characterizes at least a portion of the interaction

between the first physical subsystem and the second physical subsystem.

10. (Original) The method of claim 9, wherein:

said simulating a first physical subsystem is performed on a first processor, and

said simulating a second physical subsystem is performed on the first processor.

11. (Original) The method of claim 9, wherein:

said simulating a first physical subsystem is performed on a first processor, and

said simulating a second physical subsystem is performed on a second processor.

12. (Currently Amended) The method of claim 9, wherein <u>the number</u> n is at least two.

13. (Currently Amended) The method of claim 12, wherein <u>the number</u> n is at least four.

14. - 15.   (Cancelled)

16. (Currently Amended) The method of claim [[15]] <u>12</u>, further comprising sending a third

series of state-related ~~messages~~ <u>numerical values,</u> wherein:

<u>at least one numerical value in the first series of state-related numerical values contains</u>

<u>information relating to the values of a first proper subset of the set containing all n state-related</u>

<u>variables;</u>

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at least one ~~message~~ <u>numerical value</u> in the third series of state-related ~~messages~~ <u>numerical values</u> contains information relating to the values of a second proper subset of the set containing all n state variables, and

the second proper subset is different from the first proper subset.

17. (Currently Amended) The method of claim 16, wherein:

the messages in the first series of state-related ~~messages~~ <u>numerical values</u> are sampled at a first rate in simulation time in the first model;

the ~~messages~~ <u>numerical values</u> in the third series of state-related ~~messages~~ <u>numerical values</u> are sampled at a second rate in simulation time in the first model; and

the first rate and the second rate are not equal.

18. (Currently Amended) The method of claim 16, wherein:

the ~~messages~~ <u>numerical values</u> in the first series of state-related ~~messages~~ <u>numerical values</u> are sampled at a first rate in simulation time in the first model;

the ~~messages~~ <u>numerical values</u> in the third series of state-related ~~messages~~ <u>numerical values</u> are sampled at a second rate in simulation time in the first model; and

the first rate and the second rate are equal.

19. (Currently Amended) The method of claim 9, wherein:

a given process makes the request; and

said sending directs the first series of state-related ~~messages~~ <u>numerical values</u> to a process different from the given process.

20. (Currently Amended) The method of claim 9, further comprising:

receiving the first series of state-related ~~messages~~ <u>numerical values</u> in a first output process in communication with a first output device; and

sending to the first output device a first set of information carried by a plurality of ~~messages~~ <u>numerical values</u> in the first series of state-related ~~messages~~ <u>numerical values</u>; and

wherein the first output device is in communication with the first output process.

21. - 23. (Cancelled)

24. (Currently Amended) The ~~system~~ <u>method</u> of claim 20, wherein said displaying comprises graphing a function of the first state<u>-related</u> variable versus ~~time~~ <u>an independent variable</u>.

25. (Currently Amended) The method of claim 20, further comprising:

receiving a second series of state-related ~~messages~~ <u>numerical values</u> in the first output process; and

sending to the first output device a second set of information ~~carried~~ <u>represented</u> by a plurality of ~~messages~~ <u>numerical values</u> in the second series of state-related ~~messages~~ <u>numerical values</u>; and

wherein said sending steps comprise outputting time information associating the first set of information and the second set of information with a system time.

26. (Currently Amended) The method of claim 20, further comprising:

receiving a second series of state-related ~~messages~~ <u>numerical values</u> in a second output process, which is in communication with a second output device; and

outputting to the second output device a second set of information carried by a plurality of ~~messages~~ numerical values in the second series of state-related ~~messages~~ numerical values;

wherein said sending comprises associating the first set of information with a system time; and

said outputting comprises associating the second set of information with ~~the system time~~ an independent variable.

27. (Currently Amended) A system, comprising:

a first computer-readable medium encoded with programming instructions executable in a first process to:

implement a first continuous-time simulation model solved with a numerical solver;

accept a first command signal; and

manage the first simulation model based on the first command signal;

a second computer-readable medium encoded with a second set of programming instructions executable in a second process to:

implement a second continuous-time simulation model solved with a numerical solver;

accept a second command signal; and

manage the second simulation model based on the second command signal; and

a third computer-readable medium encoded with a third set of programming instructions executable in a third process to:

send the first command signal to said first process; and

send the second command signal to said second process.

28. (Original) The system of claim 27, wherein said managing steps are synchronized to a common system time.

29. (New) **[1, with state-space model]** The system of claim 1, wherein the first model is a state-space model.

30. (New) **[1, with resistor-companion model]** The system of claim 1, wherein the first model is a resistor-companion model.

31. (New) **[1, with different solvers]** The system of claim 1, wherein:

the implementation of the first continuous-time model uses a first numerical integration technique, and

the implementation of the second continuous-time model uses a second numerical integration technique.

32. (New) **[10, but depending from claim 1]** The system of claim 1, wherein:

the first executing process and the second executing process are executed on a first processor.

33. (New) **[11, but depending from claim 1]** The system of claim 1, wherein:

the first executing process is executed on a first processor, and

the second executing process is executed on a second processor.

34. (New) [16, with same destinations] The method of claim 16, wherein:

    the second series of state-related numerical values is sent to a first destination; and

    the third series of state-related numerical values is sent to the first destination.

35. (New) [16, with different destinations] The method of claim 16, wherein:

    the second series of state-related numerical values is sent to a first destination; and

    the third series of state-related numerical values is sent to a second destination.

36. (New) [24, graph v. time] The system of claim 24, wherein the independent variable is time.

37. (New) [24, graph v. state variable of same subsystem] The system of claim 24, wherein the independent variable is one of the n state-related variables.

38. (New) [24, graph v. state variable of other subsystem] The system of claim 24, wherein the independent variable is a state-related variable in the simulation of the second physical subsystem.

39. (New) [>=1 subsystem is ODE] A computing system for simulating a physical system, the physical system comprising two or more subsystems, the computing system comprising a plurality of computing devices, each simulating a subsystem of the physical system, wherein:

    at least one subsystem is simulated by computationally solving a system of ordinary differential equations;

    each subsystem simulation either

provides a series of output messages to another subsystem simulation, where the output messages encode state-related data from the subsystem, or

receives a series of input messages from another subsystem simulation, where the input messages encode state-related data from the other subsystem simulation, or

both provides a series of output messages to another subsystem simulation, where the output messages encode state-related data from the subsystem, and receives a series of input messages from another subsystem simulation, where the input messages encode state-related data from the other subsystem simulation; and

the computing system provides an output signal from at least one of the subsystem simulations.

40. (New) [>O(n) speed increase from division of problem] In a distributed simulation of a physical system, the improvement comprising:

running a continuous-time simulation of the physical system in a set of n computing devices;

wherein the running occurs with a speed greater than O(n) times the speed of the simulation using a single one of the computing devices.

41. (New) [... better than O(n^2)] The system of claim 40, wherein the running occurs with a speed greater than O(n^2) times the speed of the simulation using a single one of the computing devices.

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42. (New) [... **better than** $O(n^3)$] The system of claim 40, wherein the running occurs with a speed that is at least $O(n^3)$ times the speed of the simulation using a single one of the computing devices.